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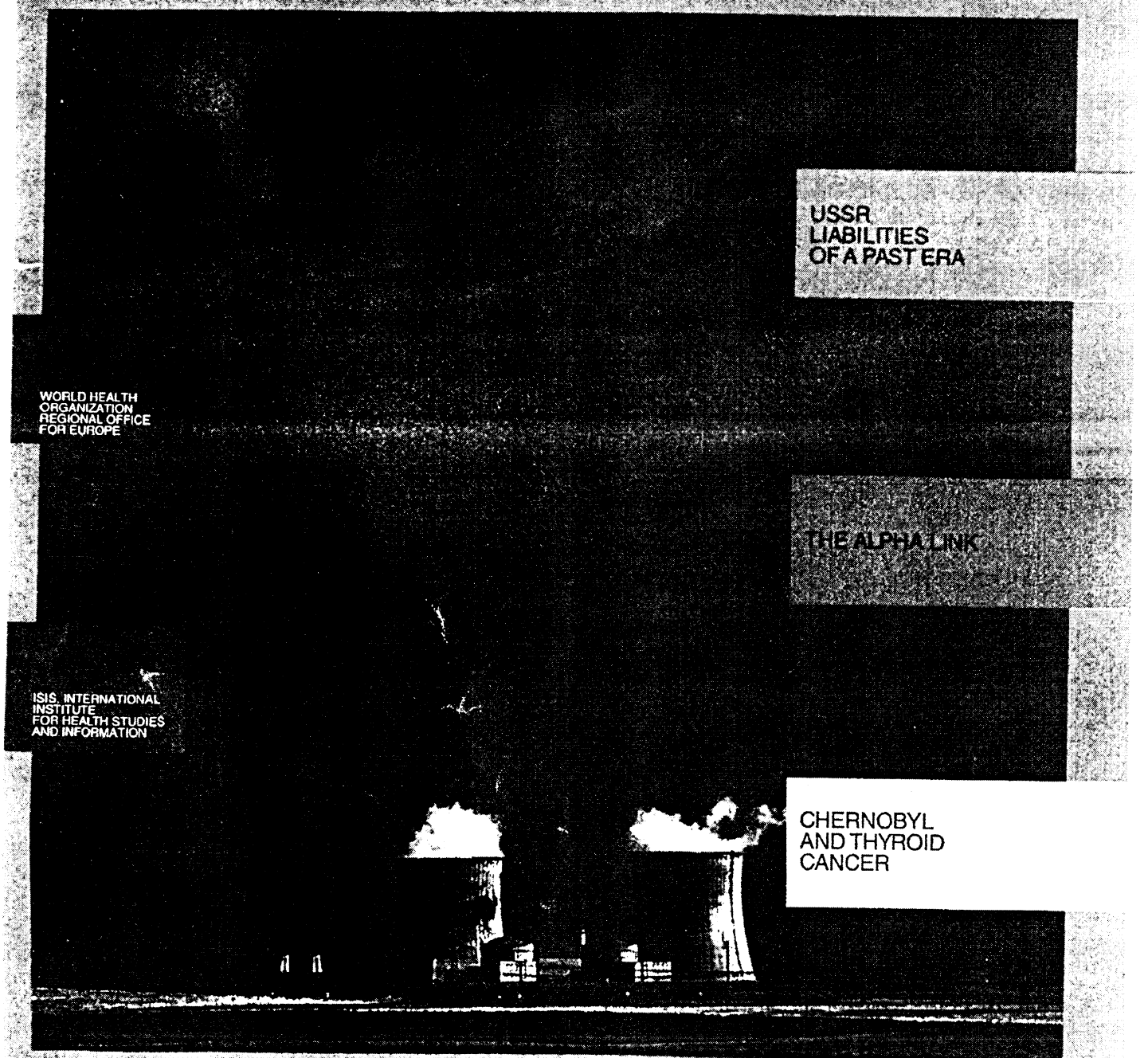

USSR
LIABILITIES
OF A PAST ERA

WORLD HEALTH
ORGANIZATION
REGIONAL OFFICE
FOR EUROPE

THE ALPHA LINK

ISIS, INTERNATIONAL
INSTITUTE
FOR HEALTH STUDIES
AND INFORMATION

CHERNOBYL
AND THYROID
CANCER

QUARTERLY - SPEDIZIONE IN ABBONAMENTO POSTALE, GRUPPO IV (70%) - TAXE PAYÉE, TASSA RISCOSSA - ROMA ITALY

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FEATURE

USSR: LIABILITIES OF A PAST ERA

CHERNOBYL

On 26 April 1986, Block 4 of the nuclear power station in Chernobyl exploded, its 200-ton graphite core ignited and, burning for 10 days, it spread radioactivity far beyond the borders of the USSR.

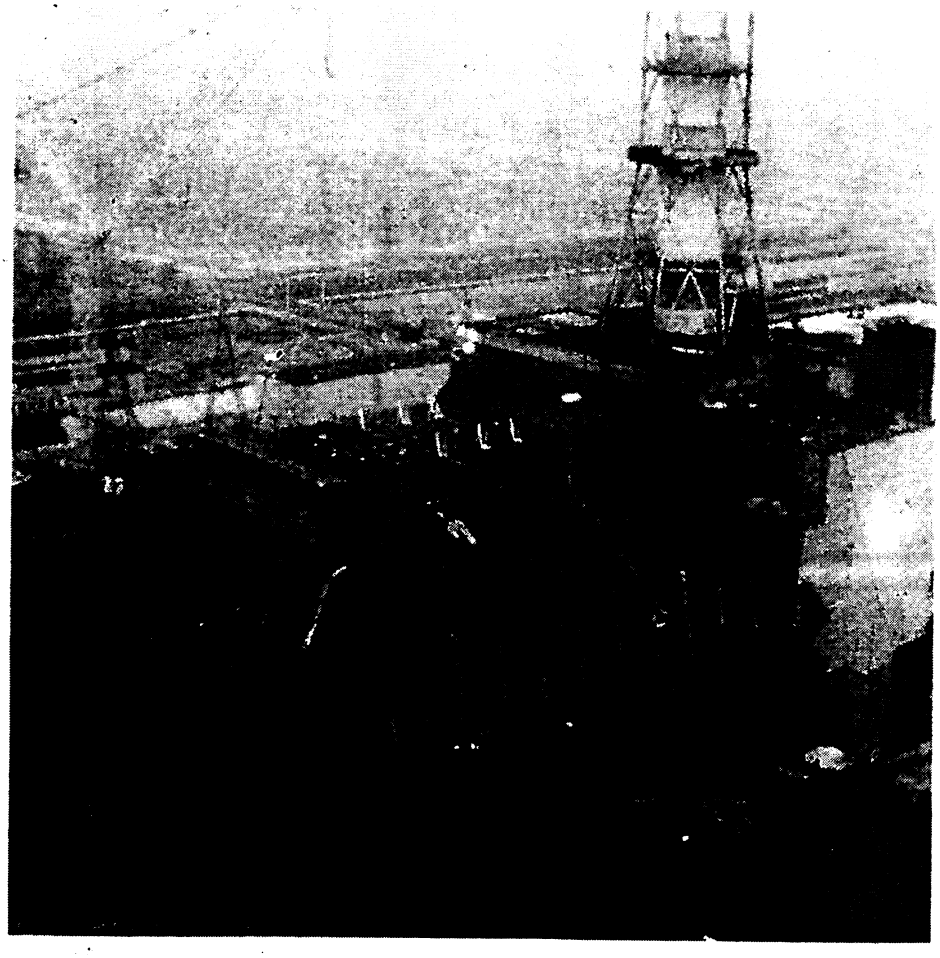
Reliable information on what had happened travelled much more slowly. At first only terse statements describing and admitting little were issued.

Then, several months later, a sudden burst of information and requests for cooperation raised expectations of a thorough investigation and follow up.

These hopes were soon dashed as the walls of secrecy again closed in.

Residents were told that everything was in order - even as they watched hundreds of thousands of "liquidators" at work, were evacuated in large numbers, and were warned against eating their own produce.

When the USSR collapsed, a pattern of earlier events emerged. While not so different from what happened elsewhere in the early years of the Cold War, they were so serious in their extent and consequences that their lessons need to be learned even now.



CHERNOBYL NUCLEAR POWER STATION

THE RIVER TECHA

Starting behind in the deadly arms race, the USSR tried desperately to close the nuclear weapons gap. A key to this effort was Mayak, a secret centre close to the city of Cheliabinsk near the southern Ural Mountains that employed several thousand workers in its reactor and plutonium separation plant. Acute radiation sickness was frequent and, though a well-kept secret until recently, it is now known that, at least in the workers of the separation plant, cancers were substantially increased.

The workers were not the only ones to pay the price for the weapons development.

At the start, all unwanted fission products were simply released into a small river, the Techa. Between 1950 and 1956, some several million curies of radionuclides were dumped there, much of which settled into the river sediments. In 1951, the Techa flooded its banks, contaminating the soil with radioisotopes that were taken up by the farm produce.

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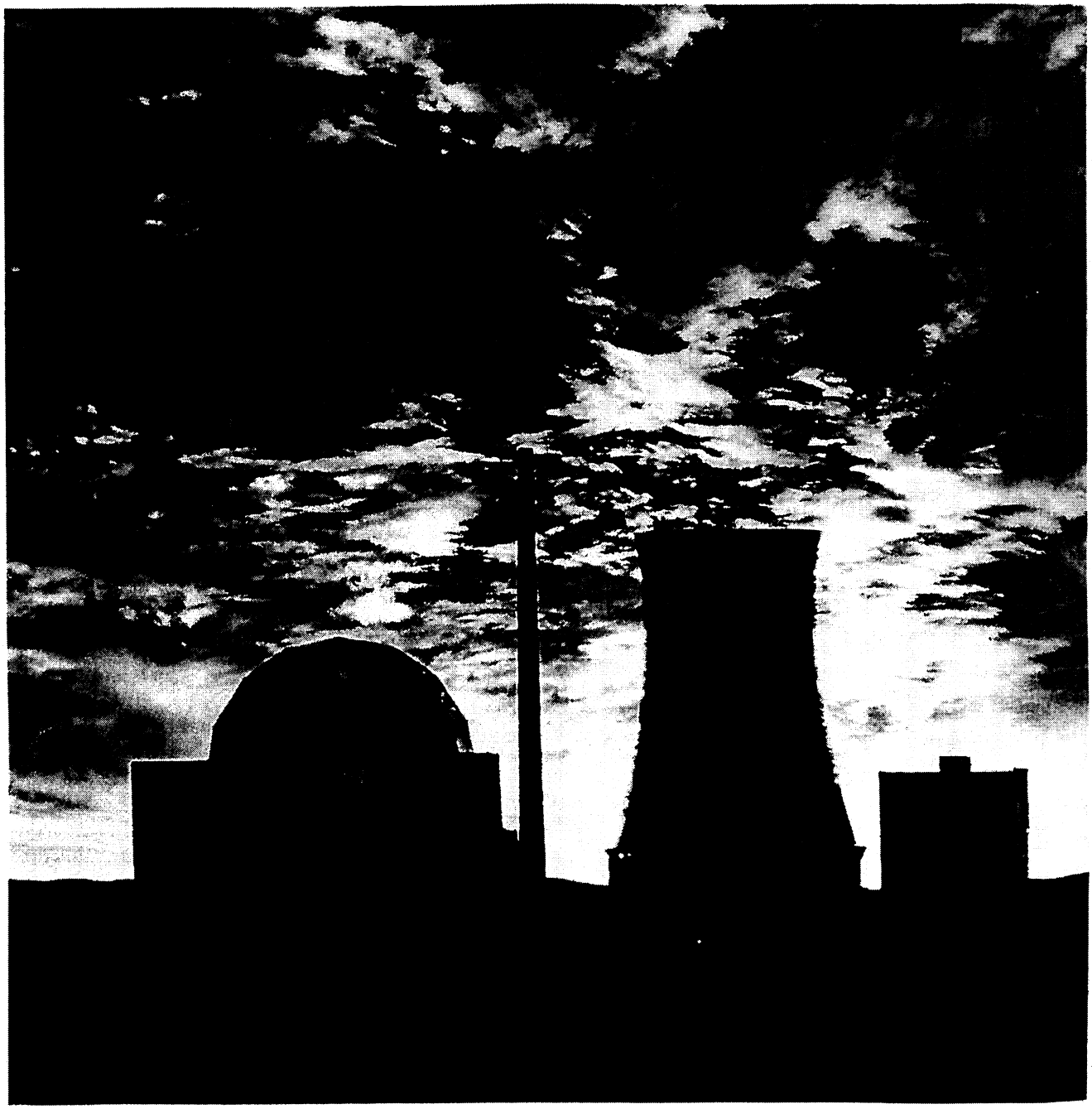
NUCLEAR WEAPONS PLANT - A SOURCE OF WORRY

Levels of gamma radiation in some river villages soon exceeded the natural rate by a factor up to 1 million. Unaware of the danger, the inhabitants continued to use the water for washing, irrigation, drinking and cooking. They were exposed both from the outside by gamma-emitting fission products, such as caesium, and from the inside by radionuclides, especially strontium, from the river water. Disguised as geodetic mapping teams, specialists from Moscow came for measurements. When they found alarmingly high radiation levels, they ordered the people in some villages, without explanation, to stop using the river water and to drill wells. But the river water tasted better, and the villagers largely continued to use it. In 1956, the most heavily contaminated villages were evacuated and destroyed. Thousands of people were relocated without explanation.

In 1957, many of these evacuees were forced to move again because of a nuclear accident at Kyshtym.

At Kyshtym, a large tank with organic solutions and fission products exploded when its cooling system failed. A cloud of fission products laden with radiostrontium contaminated thousands of square miles.



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This time the evacuation was prompt, and the total radiation exposure far less than that at the Techa river. In 1956, releases into the Techa were stopped and the fission products were dumped into manmade ponds. These ponds are now the largest open dumps of radioactivity in the world, and there are no known strategies to remove or even secure them.

OVERCOMING THE OBSTACLES

Despite the obstacles to investigating Chernobyl, the All-Union Institute for Radiation Medicine in Kiev performed valuable work on dosimetry. But before epidemiological studies could begin, responsibility was transferred to a site near Moscow. Little progress has since been seen. Even with the well-defined problem of childhood thyroid cancer in Belarus, it has not been possible to establish even a simple list of the birthdates of the patients. The opportunity has been lost of establishing a clear cohort effect that could prove beyond doubt the causal relation to the reactor accident. And this loss is clearly a loss for those so severely affected by the accident.

At the Techa river, despite the secrecy, Dr Mira Kossenka and her colleagues at the Ural Research Centre for Radiation Medicine began a follow up in 1965 of some 30,000 exposed persons and two larger control groups. They reconstructed the dosimetry of external and internal exposures using classified technical reports of the first teams to go in. Though this information is complicated and incomplete, it seems suitable for estimating the average doses from external gamma ray exposures in the various villages. Determining internal doses, especially for strontium, is more complicated but is especially reliable because it is based on actual measurements performed on individuals.

Since 1970, a sophisticated whole-body counter began measuring the strontium body burdens in residents of the Techa region, providing tens of thousands of measurements. With a biological half life of strontium in bone of about 15 years, even today's measurements are informative.

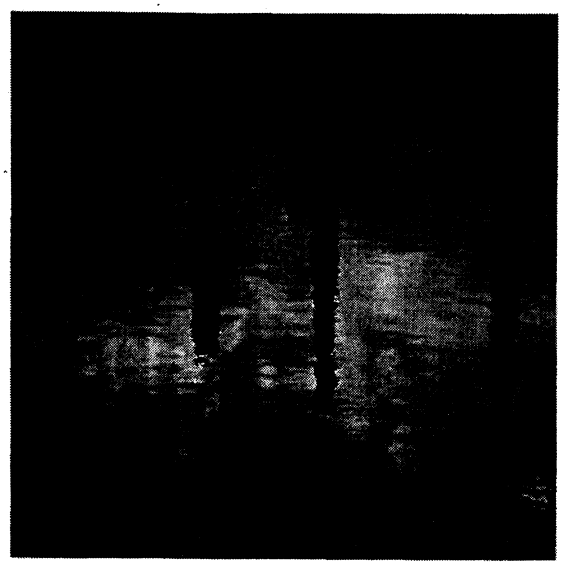
But what about the years during which strontium was incorporated into the bones? To answer this question, the scientists in Cheliabinsk developed radiation detectors that measure beta rays emitted from teeth. By correlating the measured values with the ages of the residents, they were able to reconstruct, with considerable accuracy, the accumulation of incorporated strontium during the critical years from 1950 to 1955. They found that incorporated strontium accounted for the major part of the radiation exposure. In some villages, the average dose exceeded 1 gray, with many persons exposed to several grays. These exposures are far higher than the lifetime limit of 0.35 gray that was the criterion for evacuation after the Chernobyl accident.

They also found an increase in leukemia. About half of the nearly 40 cases are believed due to the radiation exposure. One important, if tentative, conclusion is that the risk estimates are 2-3 times lower than the leukemia risk estimates from the study of the atomic bomb survivors. This agrees with radiobiological expectations of a somewhat reduced risk of radiation-induced cancer when a given dose is not given all at once, but is stretched over months or years.

The picture regarding other tumours is less clearcut because their relative excess risks after a radiation exposure are smaller than those for leukemias. A careful distinction between the incidences in Russian populations and in other ethnic groups also must also be made. Taking all this into consideration, radiation-induced increases of solid tumours have also been found.

THE FUTURE

Difficult tasks remain. Some appear to be hopelessly complicated and forbiddingly expensive, such as the clean up of the vast storage ponds of radioactivity.



WATERBORNE RADIATION WAS A HEALTH HAZARD

Other important tasks are much more feasible, such as the continued follow up of health effects. Still others should be feasible and are not less urgent, but are still far from resolution. What and how should those affected be told, and by whom? These people have been exposed for years not only to increased levels of radiation but also to falsifications and lies. By now they are reluctant, or even entirely unwilling, to accept and trust official information. This deadlock needs to be broken and a normal way of living returned to the region. And what applies to the Techa river region applies equally to other areas burdened by the past liabilities of the nuclear weapons race.

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